Operators Manual

BHT-2™

Advanced Baler-Mounted Hay Moisture Tester

ENGLISH

DOCU-M0160 07-10

Introduction

THANK YOU for purchasing the BHT-2, Advanced Baler-Mounted Hay Moisture Tester.

READ THIS MANUAL carefully to learn how to operate and service your BHT-2 correctly. Failure to do so could result in personal injury or equipment damage.

THIS MANUAL SHOULD BE CONSIDERED a permanent part of your BHT-2 and remain with the BHT-2 when you sell it.

RECORD SERIAL NUMBERS in the Warranty section. Accurately record all the numbers. Agratronix, the manufacturer, needs these numbers when you order parts.

WARRANTY is provided through Agratronix for customers who operate and maintain their BHT-2 as described in this manual. The warranty is explained in the warranty section located on page 7-1.

This warranty provides you the assurance that Agratronix will back its products where defects appear within the warranty period. In some circumstances, Agratronix also provides field improvements, often without charge to the customer, even if the product is out of warranty. Should the BHT-2 be abused, or modified to change specifications, the warranty will become void and field improvements may be denied.

If you do not understand any part of this manual and need assistance, contact Agratronix Customer Service at 1-800-821-9542.

All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

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DISCLAIMER- This baler hay moisture tester's only intended use is for testing hay as it is being formed into a bale inside the bale chamber. Do not attempt to use this tester for any other purpose than testing of hay during baling. Using this product in a manner other than what is described in this instruction manual will produce unknown results. When comparing the results of the baler hay moisture tester and hay moisture probes and windrow testers will often differ. These testers are testing the hay at different times of hay bale production and when the hay is at different densities. Therefore, the baler hay moisture tester's accuracy should not be determined by comparison with a hay probe type tester.

Set Up and Installation

TESTER COMPONENTS

The BHT-2 is comprised of a display module with mounting bracket attached by 2 knobs (A), a 10' fused power cable (B), two 35' shielded sensor cables with 12 cable ties (C), two moisture sensor kits with mounting hardware and drilling templates (D), and one USB cable (E). Identify all parts listed in the table below before beginning installation.

A

B

C

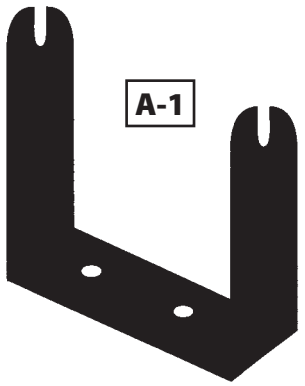
C-1

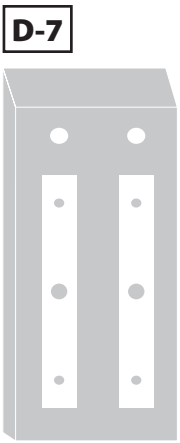
D

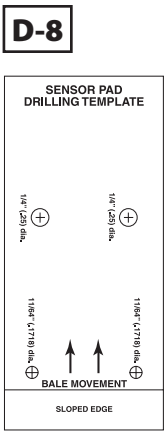
E

Set Up and Installation

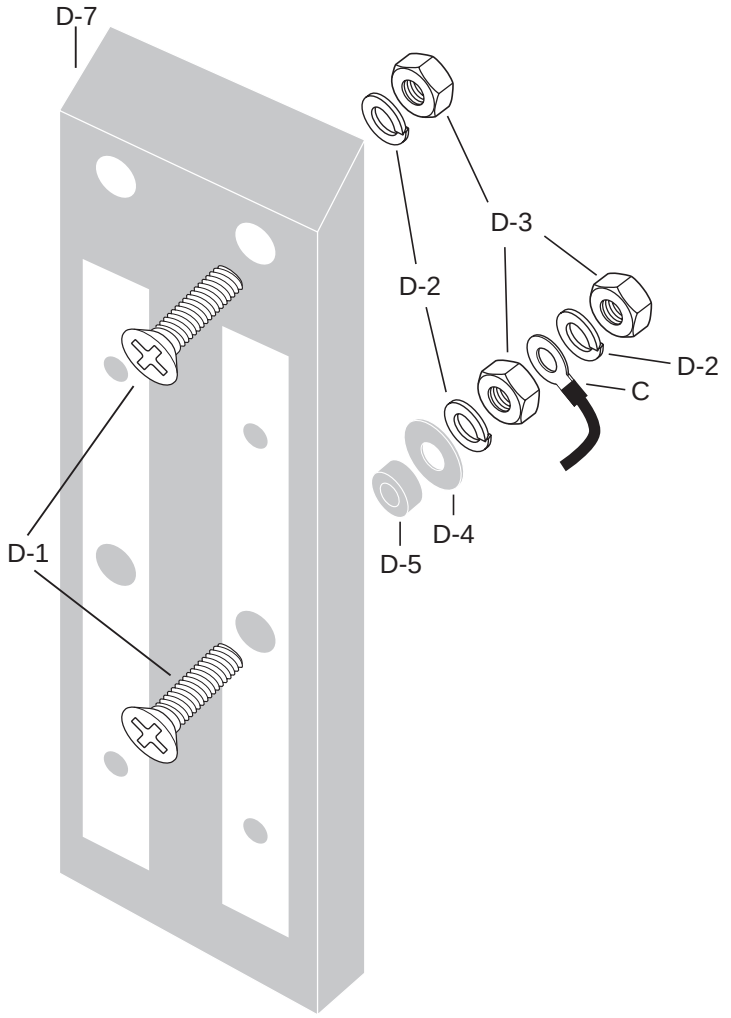
KEY	DESCRIPTION	QTY
A	Display Unit/Electronics Module	1
A-1	Mounting Bracket	1
A-2	Mounting Knobs	2
B	10’ Power Cable with 2 Amp Fuse (Automotive Blade Type) in Fuse Holder	1
C	35’ (10.6m) Shielded Sensor Cable	2
C-1	Plastic Cable Ties	12
D	Sensor Pad Kits	2
D-1	4mm X 30mm Stainless Steel Bolt	8
D-2	4mm Stainless Steel Lock Washer	12
D-3	4mm Stainless Steel Nut	12
D-4	Plastic Washer	4
D-5	Plastic Insulator	4
D-6	Sheet Metal Screw, Self Tapping, Phillips (Use with Mounting Bracket)	2
D-7	Sensor Pad	2
D-8	Drilling Template	2

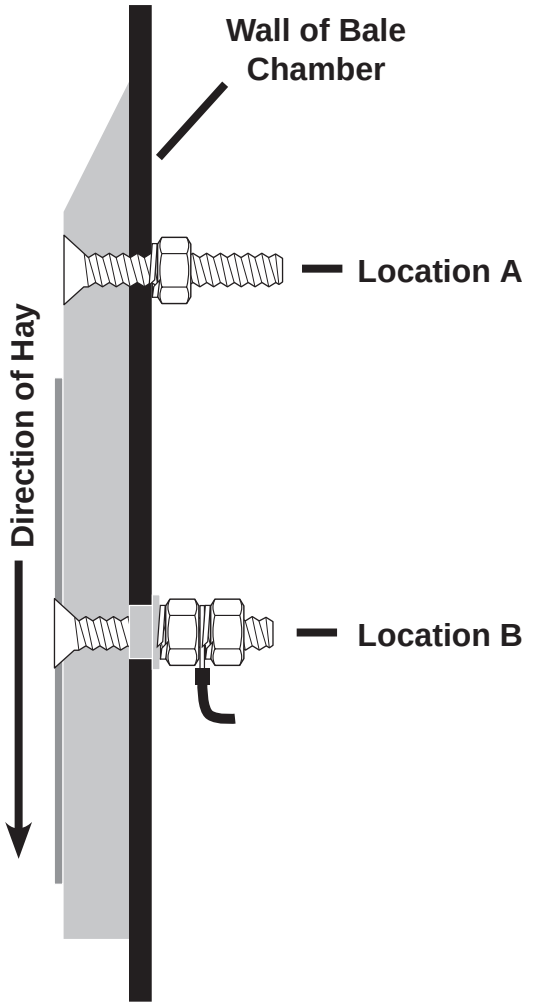






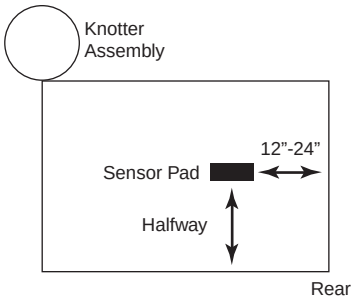
INSTALL MOISTURE SENSORS



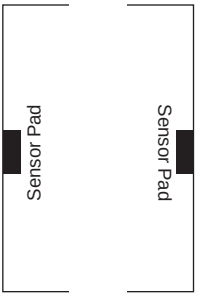

Wall of Bale Chamber
Location A
Direction of Hay
Location B

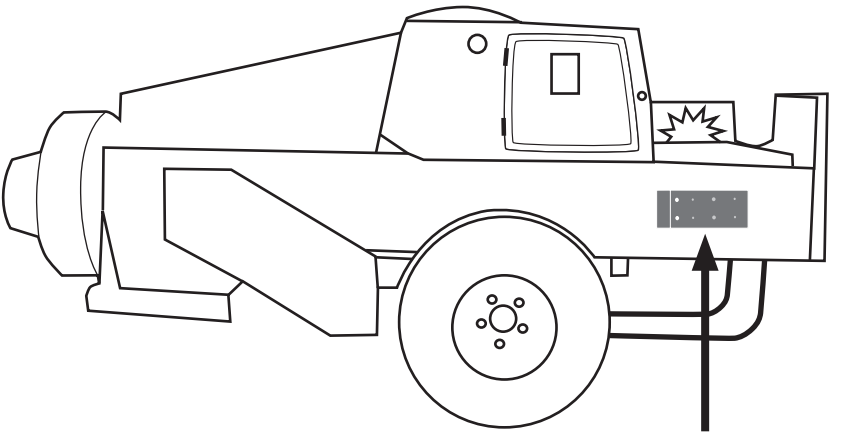
CONVENTIONAL SQUARE BALER

Side View of Bale Chamber



End View of Bale Chamber
Both Sensors Mounted





OPTIMUM SENSOR LOCATION

Set Up and Installation

CONVENTIONAL SQUARE BALER

1. Locate a flat spot on the left side of the chamber 12” to 24” from the rear of the bale chamber and about half way up the side.

SEE DIAGRAMS ON PAGE 3 & 4

2. Tape the drilling template (D-8) onto the flat location and drill the holes using the sizes indicated on the template. File any burrs from the holes once the drilling is completed.

   NOTE: The sloped (leading) edge of the sensor plate must face the plunger (opposite the direction of the bale movement).

3. Now repeat steps 1 and 2 on the right side of the chamber.

   NOTE: Your moisture tester uses 2 moisture sensor pads connected to the chamber on the left and the right side.

4. Mount the sensor assemblies on the left and right side using the hardware provided.

5. Place the sensor inside the chamber and place bolts (D-1) through the sensor pad and through the chamber as shown in (Location A). Attach washer (D-2) and nut (D-3) to bolt (D-1) but do not tighten.

6. Place bolts (D-1) through the sensor and through the chamber as shown in (Location B). Place plastic insulator (D-5) then the plastic washer (D-4) over bolt (D-1). Attach washer (D-2) and nut (D-3) to the bolt (D-1) but do not tighten.

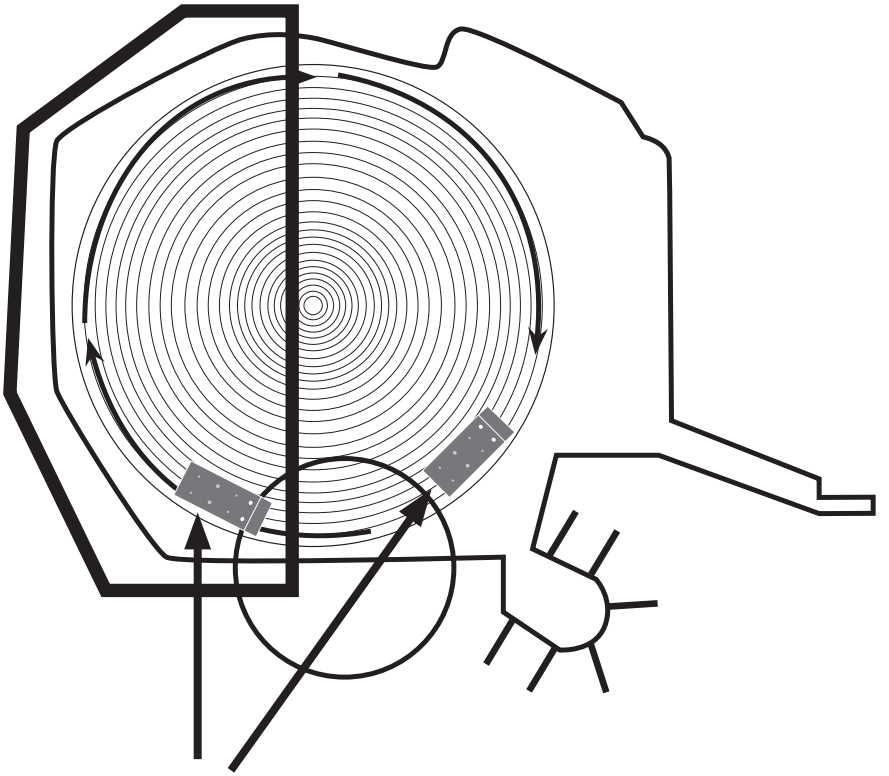
7. Now tighten the nuts and bolts at (Locations A and B).

8. Using one sensor cable per side, place one ring terminal per bolt (D-1) at (Location B) and then attach washer (D-2) and nut (D-3) to the bolts (D-1) and then tighten.

9. Before routing the cables through the baler, mark the cable that is attached to the **cut side** sensor in the bale chamber as you will need to know this later in the installation.

10. Most balers already have cable routes running from the baler to the hitch area. If this is the case, follow this same route and use any existing cable attachments. Route the sensor cable to the hitch area of the baler so that is does not interfere with any moving parts. Secure the cable with the supplied nylon ties (C-1).

ROUND BALER



Set Up and Installation

ROUND BALER

1. Locate a flat spot on the sidewall or tailgate as low as possible to the bottom of the baler.

   NOTE: Keep in mind when choosing a location for the sensors, they must be place in an area on the sidewall or tailgate where the hay is in bale form. Placing the sensors in an area where the hay is still loose will result in inaccurate readings.

2. The sloped (leading) edge of the sensor should face the pickup as shown in figure on page 7.

SEE DIAGRAMS ON PAGE 3 & 4

3. Tape the drilling template (D-8) onto the flat location and drill the holes using the sizes indicated on the template. File any burrs from the holes once the drilling is completed.

4. Now repeat steps 1 and 2 on the other side of the chamber. **Note: Your moisture tester uses 2 moisture sensor pads connected to the chamber on the left and the right side.**

5. Mount the sensor assemblies on the left and right side using the hardware provided.

6. Place the sensor inside the chamber and place bolts (D-1) through the sensor pad and through the chamber as shown in (Location A). Attach washer (D-2) and nut (D-3) to bolt (D-1) but do not tighten.

7. Place bolts (D-1) through the sensor and through the chamber as shown in (Location B). Place plastic insulator (D-5) then the plastic washer (D-4) over bolt (D-1). Attach washer (D-2) and nut (D-3) to the bolt (D-1) but do not tighten.

8. Now tighten the nuts and bolts at (Locations A and B).

9. Using one sensor cable per side, place one ring terminal per bolt (D-1) at (Location B) and then attach washer (D-2) and nut (D-3) to the bolts (D-1) and then tighten.

10. Most balers already have cable routes running from the baler to the hitch area. If this is the case, follow this same route and use any existing cable attachments. Route the sensor cable to the hitch area of the baler so that is does not interfere with any moving parts. Secure the cable with the supplied nylon ties (C-1).

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INSTALL DISPLAY MODULE

1. Select a location (on a flat surface) in the tractor cab where the display can be easily viewed while baling.
2. Using the mounting bracket as a template, mark and drill 3/32" size pilot holes and secure the bracket with the included sheet metal screws.
3. Mount the display module to the bracket by adjusting the knobs on either side of the display.

CONNECT SENSOR AND POWER CABLES

POWER CABLE CONNECTION

1. Locate a positive (+) 12 volt power wire that is controlled by the tractor's ignition switch or a constant (+) 12 volt supply and connect the red wire of the power cable.
2. Attach black wire of the power cable to the tractor frame (Negative) or other negative connection.
3. Plug the power cable connector into the display module's two pin connector.

SENSOR CABLE CONNECTION

1. Route the sensor cables from the baler to the cab of the tractor.
2. Locate the 3 pin sensor cable that was previously marked for the cut side sensor and connect it to the connector on the display module's cable marked **cut side**. Then connect the remaining sensor cable to the other connector on the display module.

UNDERSTANDING HAY CONDITIONS AND TESTER READINGS

Many variables affect the accuracy of sensor readings. Understanding these variables can help to make use of the sensor readings.

IMPORTANT: Because of the numerous variables, which affect sensor readings, the indicated moisture should not be used as an absolute and quantitative measurement. Sensor readings are, however, very useful for baling and storing hay.

Field conditions: soil moisture, high or low areas, swales, and shaded areas all affect hay moisture within the same field.

Hay varieties: leaf to stem ratio, crop maturity and different cuttings contribute to widely varying moisture distribution within the hay plants.

Harvest variables: bale density, windrow size and shape, ground moisture, the time of day, hay temperature and overall climate conditions affect hay moisture. High humidity with cloud cover contributes to more variations in hay moisture than a dry, sunny and breezy day.

Some preservatives increase conductivity: Until the preservative is fully absorbed, usually one to two days, the preservative may cause readings to be two to four points above what the same hay without preservative would read.

Bale density: As the bale becomes tighter inside the bale chamber, the moisture readings will appear higher. These higher readings are due to compaction that varies as the bale is being formed.

Each type of baler feeds hay into the bale chamber and forms the bale differently. In general, small rectangular bales are denser toward the bottom or “light” side. Large rectangular bales are densest in their upper corners.

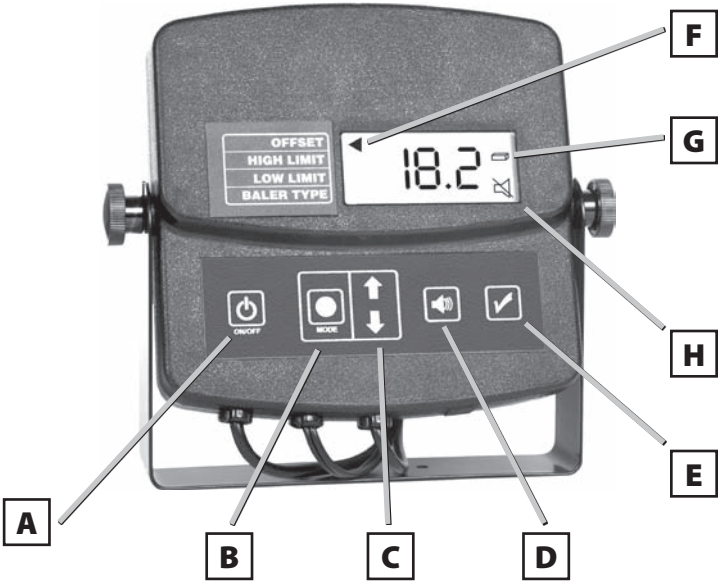
Natural variations within the windrow: Non-uniform hay moisture is expected in any given windrow. This can occur due to low-lying areas or drain off channels in a field. The hay that contacts the sensor pads does so randomly. Therefore, pockets of very dry and very wet hay may be detected and those corresponding readings will be displayed.

A poorly prepared windrow can have variations of moisture of up to 20%. Even a well-prepared windrow can vary in moisture up to 5%.

DEFINITION

"NORMAL OPERATION MODE" - This is the default mode the tester is in at power up and will be displaying the moisture of the hay in the chamber.

BUTTON FUNCTIONS



POWER ON/OFF (A)

The power on/off button (A) turns the tester on or off.

TURNING THE UNIT ON OR OFF

Press and hold the power on/off button (A) for approximately one second to turn the unit on. Press and hold the power on/off button (A) for approximately one second to turn the unit off.

NOTE: Unless you have the tester's positive (+) 12 volt wire connected to a power wire that is controlled by the tractor's ignition switch, the display module will remain on even after the tractor is turned off. You must turn the tester off to prevent accidental battery discharge.

WHAT THE CODE DISPLAYED ON THE SCREEN AT POWER UP MEANS:

When you turn the tester on an Alfa-numeric code will be displayed. This code represents the **"SOFTWARE VERSION"** of the program that your BHT-2 is using. If a new program is available it can be updated using the included USB cable and access to the Internet.

Please check our website for further information on updating your BHT-2.

MODE (B)

The mode button (B) allows you to select the various mode options which are:

MOISTURE OFFSET - Used to apply offset to reading

MOISTURE HIGH LIMIT - Used to set high limit

MOISTURE LOW LIMIT - Used to set low limit

BALER TYPE - Small square baler and round baler

USING THE MODE BUTTON:

1. When the mode button (B) is pressed, which can be done at any time, a blinking triangular indicator (F) will appear next to the mode that is currently selected. Each time the mode button (B) is pressed the triangular indicator (F) will toggle to the next mode.
2. Once you have selected the mode option you wish to change, as indicated by the blinking triangular indicator arrow (F), simply press the up or down arrows (C) to make the selected mode adjustment.

   NOTE: Once you have finished, simply wait <u>approximately</u> 10 seconds, without touching any buttons. The unit will save your changes and return to its "NORMAL OPERATING MODE", and display bale moisture.

SOUND (D)

The sound button (D) allows you to turn the buzzer sound on or off.

USING THE SOUND BUTTON:

By default, the buzzer sound will be on each time your tester unit is turned on. If you wish to turn the buzzer sound off, press the sound button (D) once. Press the sound button (D) again to turn the sound back on. If the buzzer is shut off, an icon of a speaker with a line through it (H) will be displayed in the lower right corner of the display.

CALIBRATION CHECK (E)

The calibration button (E) allows you to check the calibration of the moisture tester.

USING THE CALIBRATION CHECK BUTTON:

With the baler chamber empty press the calibration check button (E). The unit will then count down on the display 5,4,3,2,1. Then, either "CAL" or "Err" will be displayed. If "CAL" is displayed, it means the unit is calibrated and working correctly. If "Err" is displayed, it means there was a problem in calibrating the unit. If you receive the "Err" message please refer to the trouble shooting section of the manual.

NOTE: After the calibration message is displayed, the unit will return to its "NORMAL OPERATION MODE".

OPERATING THE TESTER

While the bale is being formed in the bale chamber, the BHT-2 reads and averages several tests and displays these results every two seconds. Typically, moisture readings will vary several percentage points in a single bale.

Windrows are not the same moisture from top to bottom. Usually, they will be wetter at the bottom than in the center due to ground moisture. Windrows can be wetter on the top due to dew or drier on the top because of sun and wind. Typically, low moisture hay varies less than high moisture hay.

Continuous readings from the BHT-2 and other manufacturer's meters may be higher than readings from hand-held hay probe type testers. The BHT-2 may read a couple of percentage points higher on average than hay probe type testers.

The difference in moisture readings is due to differing densities. Some balers pack the hay more tightly than others do. When a bale is released from the chamber it relaxes and is less dense then when it was initially being formed in the chamber. Tightly packed and dense hay bales appear to be higher in moisture than less tightly and less dense hay bales.

Do not be concerned that these differences exist. Rather, develop a feel for the acceptable range of moisture for baling based upon your testers readings.

Hay moisture can vary considerably from one part of a field to another. If the moisture range displayed by the tester increases above or decreases below your set limits the alarm will sound (unless you have the sound muted or limits are not set). Stop baling and determine the reason for the change in hay moisture. You may want to discontinue bailing in this area of the field.

NOTE: Hay with a moisture percentage above 20% should not be baled or stored without the use of a preservative. Hay with a moisture percentage above 25% should not be baled or stored. These recommendations have been made to prevent excessive heating of the bale and/or mold growth in the hay, and are recommendations of many agricultural specialists of the agricultural extension offices.

BASIC OPERATION

1. Turn the tester on by pressing the power on/off button (A).
2. The unit will first display the unit's "software version".
3. The unit will then display the current baler type selected and also indicate if there are any offsets or limits set in the tester.
4. You are now ready to bale hay! The tester will now begin to display the current moisture of the hay in the chamber every 2 seconds.

*****If the chamber is empty or the moisture is below the limits of the tester during the "NORMAL OPERATION MODE" the tester will display "LO" for the moisture.**

*****If the moisture is above the limits of the tester during the "NORMAL OPERATION MODE" the tester will display "HI" for the moisture.**

CHANGE TESTER SETTINGS

SETTING THE BACKLIGHT BRIGHTNESS

The tester's backlight brightness is set to maximum intensity by default on power up. When the tester is in "NORMAL OPERATION MODE", you can adjust the backlight brightness by pressing the up and down arrow buttons (C). The down arrow will decrease the brightness and the up arrow will increase the brightness.

SETTING THE MOISTURE OFFSET

If you determine that the hay is higher or lower than the displayed reading you can apply an offset to modify the displayed reading. By default the offset is set to 0%. The offset can be set within a range of -10 to +10% in 0.5% increments.

1. Press the mode button (B) until the triangular indicator (F) is blinking next to "OFFSET".
2. Use the arrow buttons (C) to adjust the offset up or down. The offset you select will be added to or subtracted from the factory calibrated reading.

   NOTE: If there is no offset applied or you wish to turn off the offset simply set the offset to 0.

3. Once you have made your changes, they will be saved and will be used every time the tester is turned on.
4. If you are done making changes to the offset, without pressing any buttons, wait approximately 10 seconds and the tester will return to “NORMAL OPERATION MODE”. If you want to make changes to another mode you can press the mode button again to change to the next mode of operation.
5. Once you have made your changes to the offset and if you have a offset applied, when the tester returns to “NORMAL OPERATION MODE” the triangular indicator (F) will be solid and pointing to “OFF-SET”. This indicates that you have an offset applied in the tester.

SETTING THE HIGH LIMIT

By default the high limit is turned off. The high limit can be set within a range of 9 to 30% in 1% increments.

1. Press the mode button (B) until the triangular indicator (F) is blinking next to “HIGH LIMIT”.
2. Use the arrow buttons (C) to adjust the high limit up or down.

   NOTE: If there is no high limit applied, or you wish to turn the high limit off, simply use the arrow buttons (C) until the word “OFF” is displayed for the high limit.
3. Once you have made your changes they will be saved and will be used every time the tester is turned on.
4. If you are done making changes to the high limit, without pressing any buttons, wait approximately 10 seconds and the tester will return to “NORMAL OPERATION MODE”. If you want to make changes to another mode you can press the mode button to change to the next mode of operation.
5. Once you have made your changes to the high limit, and if you have a high limit applied, when the tester returns to “NORMAL OPERATION MODE” the triangular indicator (F) will be solid and pointing to the “HIGH LIMIT”. This indicates that you have a high limit applied to the tester.

   NOTE: The tester will beep if you have a high limit set and the hay moisture is above the set limit.

SETTING THE LOW LIMIT

By default the low limit is turned off. The low limit can be set within a range of 9 to 30% in 1% increments.

1. Press the mode button (B) until the triangular indicator (F) is blinking next to “LOW LIMIT”.
2. Use the arrow buttons (C) to adjust the low limit up or down.

   NOTE: If there is no low limit applied, or you wish to turn the low limit off, simply use the arrow buttons (B) until the word “OFF” is displayed for the low limit.
3. Once you have made your changes they will be saved and will be used every time the tester is turned on.
4. If you are done making changes to the low limit, without pressing any buttons, wait approximately 10 seconds and the tester will return to “NORMAL OPERATION MODE”. If you want to make changes to another mode you can press the mode button to change to the next mode of operation.
5. Once you have made your changes to the low limit, and you have a low limit applied, when the tester returns to “NORMAL OPERATION MODE” the triangular indicator (F) will be solid and pointing to the “LOW LIMIT”. This indicates that you have a low limit applied to the tester.

   NOTE: The tester will beep if you have a low limit set and the hay moisture is below the set limit.

SETTING THE BALER TYPE

1. Press the mode button (B) until the triangular indicator (F) is blinking next to “BALER TYPE”.
2. Use the arrow buttons (C) to select the required baler type as indicated by icon (G).

TROUBLESHOOTING THE BALER HAY TESTER

PROBLEM: Tester will not power on.

SOLUTION:
- Check all power connections and the 2 amp fuse inside the fuse holder.
- Use a test light to ensure that the power cable has power.

PROBLEM: Tester will not calibrate and displays “Err” during calibration.

SOLUTION:
- Check all cable and sensor connections to ensure nothing is shorted.
- Make sure the chamber is empty before performing the calibration.
- With a light steel wool pad, polish both sensor pads and retry calibration.

PROBLEM: Tester only displays “HI” for the moisture reading.

SOLUTION:
- Check all cable and sensor connections to ensure nothing is shorted.
- Determine by some other means if the hay being tested is with the operating limits of the tester.

PROBLEM: Tester only displays “LO” for the moisture reading.

SOLUTION:
- Check all cable and sensor connections to ensure nothing is open.
- Determine by some other means if the hay being tested is with the operating limits of the tester.

PROBLEM: Tester reading seems to read erratic or incorrect.

SOLUTION:
- See the section of the manual “UNDERSTANDING HAY CONDITIONS AND TEST READINGS”.

If all of these steps fail, please read the manual again carefully or contact customer service using the contact information provided in this manual.

REPLACING A SENSOR PAD

The sensor pads and contacts can become worn. Contact your Agratronix tester dealer to order replacement sensor pads. See “INSTALL MOISTURE SENSORS” for installation instructions.

CARE, MAINTENANCE AND STORAGE

After each use or after the harvest season, remove the display module (if it is not inside a dry cab) and store in a clean and dry place.

Always use the weatherproof plug covers on the sensor cables to keep moisture and dirt from getting into the electrical contacts.

The stainless steel contacts on the moisture sensors should be kept clean for the best results. Clean with fine steel wool and/or mineral spirits or alcohol. Dirty contacts can cause lower readings.

Check all nuts and screws on the moisture sensor plates and tighten if necessary. Make sure the sensor pad leading edge is secured flat and tight to the bale chamber wall.

TESTER ACCESSORIES

Replacement Sensor Pads (Agratronix part number: SUBA-S0302), all nuts, screws and spacers used for replacing a worn sensor pad.

We recommend changing both sensor pads at the same time.

Warranty and Service

If the BHT-2 tester should display inaccurate readings or cease to operate, follow these steps:

1. Review this manual, particularly the *Button Functions, Operations* and *Care and Maintenance* sections.
2. Call our toll-free number, 1-800-821-9542, and ask for customer service. Be certain to call between 8:30 a.m. and 4:30 p.m. Eastern Standard Time. Describe the problem to our service personnel so that a determination can be made as to what is wrong with the tester. If necessary, arrangements can be made for repair or replacement and a Return Authorization number will be given to you. Be certain to have the BHT-2's serial number available.
3. In the event factory service is required AND AUTHORIZATION HAS BEEN OBTAINED, pack the unit carefully and return to AgraTronix PREPAID. Be certain to include your name and return address.
4. Do not return the tester without following the above procedure.
5. Repairs will be made free of charge during the warranty period. After the warranty expires, the tester will be repaired at a flat fee.

IMPORTANT WARRANTY INFORMATION

1. PROOF OF PURCHASE (retail sales receipt) must be included with returned tester to obtain free warranty service. Without proof, tester will be assumed to be out of warranty and repair costs will be invoiced.
2. Every BHT-2 has a serial number identification located inside the battery compartment. Note this serial number on the appropriate line on the next page and refer to it in all communication with the factory.

WARRANTY

The BHT-2 Advanced Baler-Mounted Hay Moisture Tester is guaranteed by Agratronix to be free from defects in materials and workmanship for one year from date of retail purchase. This warranty does not cover damage resulting from misuse, neglect, accident or improper installation or maintenance. This warranty does not apply to any product which has been repaired or altered outside the factory. The manufacturer does not assume any liability for damage from misuse, dropping the tester or damage resulting from or damage caused by water or from unauthorized repair. The warranty does not cover any damage which may directly, indirectly, consequentially or incidentally result from use or inability to use the BHT-2 tester.

The foregoing warranty is exclusive and in lieu of all other warranties of merchantability, fitness for purpose and any other obligation or liability in connection with its product.

RECORD SERIAL NUMBER

NOTE: The hay tester serial number is located on the backside of the display module.

Write your model number, serial number and date of purchase in the space provided below. Your dealer needs this information when ordering parts and when filing warranty claims.

Model No. _____

Serial No. _____

Date of Purchase _____

(To be filled in by the owner)

Contact Information

For manufacturer information and customer service, please contact:

Toll-Free 1-800-821-9542
1-330-562-2222
FAX 1-330-562-7403
www.agratronix.com

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